University of California
College of Agriculture
Agricultural Experiment Station
Berkeley, California

SEASONAL LABOR NEEDS FOR CALIFORNIA CROPS

SOLANO COUNTY

(Excluding Delta Lands)

Progress Report No. 48

by

R. L. Adams

Preliminary -- Subject to Correction

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Mimeographed Report No. 53

(Farm Labor Survey -- July-December, 1936)

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Seasonal Labor Needs of California Crops

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(Excluding Delta Lands)

Scope of Presentation.-- The following considerations govern the presentation of this progress report:

1. The data are confined to the area indicated above.

2. The data are confined solely to crops, livestock needs being ignored.

3. The findings apply only to occasional or seasonal labor requirements as distinguished from labor contributed by farm operators and by workers employed on a year-round or regular basis of employment.

4. Attention is concentrated upon workers required for hand tasks -- planting, thinning, weeding, hoeing, and harvesting -- without including teamsters, tractor drivers, irrigators, and shed packers of vegetables or fruits.

5. The presentation includes the so-called migratory, transient, or roving workers which comprise an important source of help needed in connection with certain tasks and at "peak" times which seasonally arise in connection with many field, truck, and fruit crops commercially produced in California.

6. This report is confined to California's need for seasonal agricultural workers because of the more pressing problems liable to arise in connection therewith. A later study is planned which will deal with other kinds of labor involved in the production of California's many crops.

Brief Description of the Area.-- Solano County is one of the central counties of California, and is located about midway between the cities of San Francisco and Sacramento, and north of the mouth of the combined Sacramento and San Joaquin rivers, from their junction to San Pablo Bay. On the north it is bounded by Yolo County; and on the west by Napa County, the line following an irregular course along the Vaca Mountains. On the east and south it is separated from Sacramento and Contra Costa counties respectively, by the Sacramento River, which, after following a general southerly course, curves westward and joined by the San Joaquin River flows into the Bay. The county is quite irregular in shape, its extreme dimensions being about 32 miles north and south by about 44 miles east and west. It has an area of 526,080 acres, of which 365,941 acres are classed as available for crops by the 1935 Census. This is further classified by the Census as follows:

	Acreage
Crop land harvested	169,556
Crop failure	2,882
Crop land idle or fallow	43,482
Plowable pasture	150,021
Total	365,941

(Note: This table includes the whole county, a portion of which lies in the Delta and is excluded from this report.)

(Farm Labor Survey -- July-December, 1936)

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(Excluding Delta Lands)

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	Acreage
Crop land harvested	164,000
Crop failure	6,802
Crop land idle or fallow	44,402
Plowable pasture	150,021
Total	365,044

(Note: This table includes the whole county, a portion of which lies in the Delta and is excluded from this report)

There are several agricultural districts in the area -- one of these is the Suisun Valley, contiguous to the cities of Suisun and Fairfield, largely used for the production of fruits. It is about 4 miles in width at the lower end, and extends for about 7 miles in length, becoming narrower as it approaches the upper end. Most of this district is under 100 feet in elevation above sea level.

Another district, roughly 10 miles square, and lying in the southern part of the county, is known as the Montezuma Hills. It is quite rolling in topography, with elevations up to about 250 feet, and is extensively used for grain production. A third district, contiguous to Vacaville, is noted for fruit production. A fourth includes an area about 12 miles square in the vicinity of Dixon, which is largely used for alfalfa, grain and field crops. It is mostly under 75 feet in elevation, and quite flat in topography.

The soils of the county are mostly of the heavier textures, ranging from loam and silty-clay loam to clay adobe. The valley soils, upon which most of the fruit is grown, are largely silty-clay loam, 6 feet or more in depth. The soils in the Montezuma Hills are heavier textured being mostly clay adobe from 3 to 6 feet in depth.

Crops, Acreage, and Production.-- The basis used in calculating occasional or seasonal need for labor, other than that furnished by farm operators and regularly employed workers appears as table 1. This table does not include that portion of the county which lies in the Delta, since the Delta, including portions of 5 counties, is considered as a separate unit in Progress Report No. 59. Due to lack of assembled data , acreage and production figures shown in table 1 are estimates based on information obtained from various sources. They are believed to represent conditions with a fair degree of accuracy.

TABLE 1

Basis for Calculating Seasonal Labor Requirements -- Solano County
(Excluding Delta Lands)

Crops	Acreage	Production
Field crops:		
Alfalfa	5,600	33,600 tons
Grain -- wheat, barley, oats	82,000	--
Grain -- sorghums*		
Hay (other than alfalfa)	16,000	20,000 tons
Sugar beets	655	8,515 tons
Vegetable crops:		
Tomatoes	692	4,844 tons
Fruit and nut crops:		
Almonds	1,182	420 tons
Apples*	25	--
Apricots	4,042	(6,500 tons dried (fresh weight)†
		(2,000 tons sold fresh
Cherries	608.4	(120 tons barrelled
		(200 tons shipped
Figs (mostly Mission)	256	140 tons (dry weight)
Grapes (table varieties)	504	2,000 tons
(wine varieties)	1,056	4,000 tons

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Another district, roughly 10 miles square, and lying in the southern part of the county, is known as the Montezuma Hills. It is quite rolling in topography, with elevations up to about 250 feet, and is extensively used for grain production. A third district, contiguous to Vacaville, is noted for fruit production. A fourth includes an area about 12 miles square in the vicinity of Dixon, which is largely used for alfalfa, grain and field crops. It is mostly under 75 feet in elevation and quite flat in topography.

The soils of the county are mostly of the heavier texture, ranging from loam and silty-clay loam to clay adobe. The valley soils, upon which most of the fruit is grown, are largely silty-clay loam, 6 feet or more in depth. The soils in the Montezuma Hills are heavier textured being mostly clay adobe from 3 to 6 feet in depth.

Crops, Acreage, and Production.-- The basis used in calculating seasonal or seasonal need for labor, other than that furnished by farm operators and regularly employed workers appears as table 1. This table does not indicate that portion of the county which lies in the Delta, since the Delta, including portions of 5 counties, is considered as a separate unit in Progress Report No. 59. Due to lack of assembled data, acreage and production figures shown in table 1 are estimates based on information obtained from various sources. They are believed to represent conditions with a fair degree of accuracy.

TABLE 1

Basis for Calculating Seasonal Labor Requirements -- Solano County
(Excluding Delta Lands)

Crops	Acreage	Production
Field crops:		
Alfalfa	5,800	23,200 tons
Grain -- wheat, barley, oats	22,000	--
Grain -- sorghum		
Hay (other than alfalfa)	16,000	20,000 tons
Sugar beets	655	6,216 tons
Vegetable crops:		
Tomatoes	692	4,844 tons
Fruit and nut crops:		
Almonds	1,172	420 tons
Apples	23	--
Apricots	4,012	(6,800 tons dried (fresh weight)† (2,000 tons sold fresh
Cherries	608	(120 tons berried (200 tons shipped
Figs (mostly Adriatic)	225	140 tons (dry weight)
Grapes (table varieties)	205	[illegible] tons
(wine varieties)	1,080	4,000 tons

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Crops	Acreage	Production
Fruit and nut crops: (continued)		
Peaches (practically all freestone)	2,449	12,265 tons dried (fresh weight)†
Pears (mostly Bartlett)‡	3,073	(4,000 tons sold fresh (2,250 tons dried (fresh weight)†
Plums	3,315	2,000 tons (152 cars)
Prunes	6,276	16,000 tons (fresh weight)†
Walnuts*	252	191,000 pounds ϕ

*Use of seasonal labor inconsequential on these crops, and hence has been ignored.

†Drying ratios as used in this report are:

Apricots	5.50 pounds fresh to 1 pound dried.
Peaches	5.50 pounds fresh to 1 pound dried.
Pears	5.00 pounds fresh to 1 pound dried.
Prunes	2.25 pounds fresh to 1 pound dried.

‡Pear crop was light in 1935 -- normally is about 13,000 tons.

ϕWalnut production reported by the Control Board was 158,600 pounds merchantable nuts -- 17 per cent additional has been added for culls.

Operations Requiring Use of Seasonal Labor and Time of Need.-- Farm operations requiring the use of seasonal labor for the various crops raised in Solano County (excluding that part of the county lying in the Delta) are indicated in table 2. This tabulation does not include the employing of shed workers needed to wash, pack, and prepare various commodities for shipping and marketing.

TABLE 2
Operations Requiring Use of Seasonal Labor and Time of Need by Crops
Solano County, (Excluding Delta Lands)

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Field crops:				
Alfalfa	Mowing Raking Shocking Baling -- not done generally -- mostly fed loose or ground for meal	Apr. 1 to Oct. 31) 5/7 of acreage each month	50	7.5 acres 15 acres 30 acres
Grain	Harvesting	June 1-30 -- 60 per cent of acreage) July 1-31 -- 40 per cent of acreage)	80 80	5 acres 5 acres

Table continued on next page.

Table 1 continued

Crop	Acreage	Production
Fruit and nut crops: (continued)		
Peaches (practically all freestone)	2,440	19,265 tons dried (fresh weight)†
Pears (mostly Bartlett)¶	3,075	(4,000 tons sold fresh (2,250 tons dried (fresh weight)†
Plums	3,315	2,000 tons (152 cars)
Prunes	8,276	16,000 tons (fresh weight)†
Walnuts*	252	191,000 pounds ¶

*Use of seasonal labor inconsequential on these crops, and hence has been ignored.

†Drying ratios used in this report are:

Apricots	8.50 pounds fresh to 1 pound dried.
Peaches	8.50 pounds fresh to 1 pound dried.
Pears	8.00 pounds fresh to 1 pound dried.
Prunes	2.25 pounds fresh to 1 pound dried.

¶Pear crop was light in 1938 -- normally is about 15,000 tons.

¶Walnut production reported by the Control Board was 188,000 pounds merchantable nuts -- 17 per cent additional has been added for culls.

Operations Requiring Use of Seasonal Labor and Time of Need.-- Farm operations requiring the use of seasonal labor for the various crops raised in Solano County (excluding that part of the county lying in the Delta) are indicated in table 2. This tabulation does not include the employing of shed workers needed to wash, grade and prepare various commodities for shipping and marketing.

TABLE 2

Operations Requiring Use of Seasonal Labor and Time of Need by Crops
Solano County. (Excluding Delta Lands)

Crop	Operation	Time of need by month	Per cent of work done by contract per month
Field crops:			
Alfalfa	Bowing Raking Shocking Baling -- not done generally -- mostly fed loose or ground for meal	Apr. 1 to Oct. 31 } 8/7 of acreage each month	50
Grain	Harvesting	June 1-30 -- 60 per cent of acreage July 1-31 -- 40 per cent of acreage	60 60

Table 2 continued

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Field crops: (continued)				
Hay, other than alfalfa	Mowing	May -- all acreage	80	7.5 acres
	Raking	May -- all acreage	80	15 acres
	Shocking	May -- all acreage	80	30 acres
	Baling -- 90 per cent of crop	May -- 50 per cent of job June -- 50 per cent of job	90	5 tons
Sugar beets	Thinning	Feb. -- 10 per cent of acreage March -- 40 per cent of acreage April -- 35 per cent of acreage May -- 15 per cent of acreage	100	0.5 acre
	Hoeing -- 2 times	May -- all of acreage June -- all of acreage	100	1.5 acres
	Topping and loading	July -- 11 per cent of crop August -- 40 per cent of crop Sept. -- 26 per cent of crop Oct. -- 23 per cent of crop	100	6 tons
Vegetable crops:				
Tomatoes:	Transplanting	Feb. 15-28 -- all of job	80	5,000 plants
	Planting	Apr. 25-30 -- 25 per cent of acreage May 1-15 -- 75 per cent of acreage	100	0.75 acre
	Hoeing -- 1 time	May -- 50 per cent of acreage June -- 50 per cent of acreage	100	2 acres
	Picking	Aug. 15-31 -- 15 per cent of crop Sept. 1-30 -- 45 per cent of crop Oct. 1-31 -- 40 per cent of crop	100	2,500 pounds
Fruit and nut crops:				
Almonds	Knocking	Aug. 6-31 -- 50 per cent of crop Sept. 1-30 -- 50 per cent of crop	100	280 pounds (varies greatly)

Table continued on next page.

Table 2 continued

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Field crops (continued)				
Hay, other than alfalfa	Mowing	May -- all average	80	7.5 acres
	Raking	May -- all average	80	15 acres
	Shocking	May -- all average	80	30 acres
	Baling -- 20 per cent of crop	May -- 50 per cent of job June -- 50 per cent of job	80	6 tons
Sugar beets	Thinning	Feb. -- 10 per cent of average March -- 40 per cent of average April -- 35 per cent of average May -- 15 per cent of average	100	0.5 acre
	Hoeing -- 2 times Topping and loading	May -- all of average June -- all of average July -- 11 per cent of crop August -- 40 per cent of crop Sept. -- 24 per cent of crop Oct. -- 25 per cent of crop	100	1.5 acres 6 tons
Vegetable crops:				
Tomatoes:	Transplanting	Feb. 15-25 -- all of job	80	5,000 plants
	Tieing	Apr. 25-30 -- 25 per cent of average May 1-15 -- 75 per cent of average	100	0.75 acre
	Hoeing -- 1 time	May -- 50 per cent of average June -- 50 per cent of average	100	.2 acres
	Picking	Aug. 15-31 -- 15 per cent of crop Sept. 1-30 -- 45 per cent of crop Oct. 1-31 -- 40 per cent of crop	100	2,500 pounds
Fruit and nut crops:				
Almonds	Knocking	Aug. 5-31 -- 50 per cent of crop Sept. 1-30 -- 50 per cent of crop	100	280 pounds (varies greatly)

Table 2 continued.

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Almonds: (continued)	Hulling -- by machine	Aug. 6-31 -- 50 per cent of crop Sept. 1-30 -- 50 per cent of crop	50	400 to 700 pounds (average 500 pounds)
Apricots	Pruning	Nov. -- 75 per cent of acreage Dec. -- 25 per cent of acreage	100	0.25 acre
	Thinning	Apr. 15-30 -- 50 per cent of acreage May 1-15 -- 50 per cent of acreage	100	0.25 acre
	Picking	June 10-30 -- 40 per cent of crop July 1-15 -- 60 per cent of crop	100	1,000 pounds
	Cutting for drying	June 25-30 -- 25 per cent of job July 1-15 -- 75 per cent of job	100	600 pounds
	Other labor in dry yards	June 25-30 -- 20 per cent of job July 1-20 -- 80 per cent of job	100	11 hours per fresh ton*
Cherries	Picking for canning	May 1-20 -- all of crop	100	225 pounds
	Picking for shipping† -- 3 or 4 times	Apr. 15-30 -- none in 1935 May 1-31--- 70 per cent of crop June 1-10 -- 30 per cent of crop	100	150 pounds
	Packing for shipping	Apr. 15-30 -- none in 1935 May 1-31 -- 70 per cent of crop (12 cars) June 1-10 -- 30 per cent of crop (5 cars)	100	15 boxes = 225 pounds
Figs	Picking up for drying	Aug. 15-31 -- 50 per cent of dry tonnage Sept. 1-15 -- 50 per cent of dry tonnage	100	666 pounds
	Treating with gas, drying, sorting, and sacking	Aug. 15-31 -- 50 per cent of dry tonnage Sept. 1-15 -- 50 per cent of dry tonnage	100	about 40 hours per dry ton

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Table 2 continued

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Fruit and nut crops: (continued) Grapes	Pruning	Dec. -- 1/3 of acreage) Jan. -- 1/3 of acreage) Feb. -- 1/3 of acreage)	100	0.75 acre
	Hoeing 1 time -- 50 per cent of acreage	Mar. 1-31 -- 50 per cent) of job) Apr. 1-20 -- 50 per cent) of job)	100	0.75 acre
	Suckering -- 20 per cent of acreage	May 15-31 -- 20 per cent) of acreage)	100	0.75 acre
	Picking	Sept. 10-30 -- 50 per) cent of crop) Oct. 1-20 -- 50 per) cent of crop)	100	2,000 pounds
Peaches -- freestone	Pruning	Oct.-- a small amount) Nov. -- 25 per cent of) acreage) Dec. -- 25 per cent of) acreage) Jan. -- 25 per cent of) acreage) Feb. -- 25 per cent of) acreage)	100	0.25 acre
	Thinning	Apr. 15-30 -- 50 per cent) of job) May 1-15 -- 50 per cent) of job)	100	0.25 acre
	Picking	July 20-31 -- 25 per cent) of crop) Aug. 1-31 -- 75 per cent) of crop)	100	3,000 pounds
	Cutting for drying	July 20-31 -- 25 per cent) of job) Aug. 1-31 -- 75 per cent) of job)	100	2,000 pounds
	Other dry-yard work	July 20-31 -- 20 per cent) of job) Aug. 1-31 -- 70 per cent) of job) Sept. 1-7 -- 10 per cent) of job)	100	11 1/2 hours per fresh ton dried

Table continued on next page.

Table 2 continued

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Fruit and nut crops: (continued) Pears	Pruning	Nov. 1-30 -- 10 per cent of acreage Dec. 1-31 -- 30 per cent of acreage Jan. 1-31 -- 30 per cent of acreage Feb. 1-28 -- 25 per cent of acreage Mar. 1-15 -- 5 per cent of acreage	100	0.20 acre
	Brush burning	Nov. 1-30 -- 10 per cent of acreage Dec. 1-31 -- 30 per cent of acreage Jan. 1-31 -- 30 per cent of acreage Feb. 1-28 -- 25 per cent of acreage Mar. 1-15 -- 5 per cent of acreage	100	4 acres
	Picking	July 6-31 -- 25 per cent of crop Aug. 1-31 -- 75 per cent of crop	100	1,400 pounds
	Cutting for drying	July 15-31 -- 25 per cent of job Aug. 1-31 -- 60 per cent of job Sept. 1-15 -- 15 per cent of job	100	800 pounds
	Other labor in dry yard	July 15-31 -- 25 per cent of job Aug. 1-31 -- 50 per cent of job Sept. 1-20 -- 25 per cent of job	100	26 1/2 hours per fresh ton
Plums	Pruning -- 50 per cent of acreage	Dec. -- 5 per cent of acreage Jan. -- 20 per cent of acreage Feb. -- 20 per cent of acreage Mar. -- 5 per cent of acreage	100	0.5 acre

Table continued on next page.

Table 2 continued

Crop	Operation	Time of need by month	Per cent of work done by seasonal help	Output per man-day
Plums (continued)	Thinning	Apr. 15-30 -- 50 per cent of acreage May 1-15 -- 50 per cent of acreage	100	0.33 acre (varies greatly)
	Picking	June 1-30 -- 33 per cent of crop July 1-31 -- 28 per cent of crop Aug. 1-31 -- 39 per cent of crop	100	1,200 pounds
Prunes	Pruning	Oct. 15-31 -- 20 per cent of acreage Nov. 1-30 -- 40 per cent of acreage Dec. 1-31 -- 40 per cent of acreage	100	0.25 acre
	Burning brush	Oct. 15-31 -- 20 per cent of acreage Nov. 1-30 -- 40 per cent of acreage Dec. 1-31 -- 40 per cent of acreage	100	4 acres
	Picking up	Aug. 15-31 --1/3 of crop Sept. 1-30 -- 2/3 of crop	100	1,500 pounds
	Dipping and drying -- 50 per cent by dehydrator	Aug. 15-31 -- 1/3 of crop Sept. 1-30 -- 2/3 of crop	90	8.3 hours per fresh ton*

* From Christie, A. W. and L. C. Barnard. The principles and practice of sun-drying fruit. California Agr. Exp. Sta. Bul. 388. 1925.

† Cherry picking usually starts in April. Cherry crop was light in 1935 and later than usual.

Findings of Seasonal Labor Needs.-- Details and summaries of seasonal labor requirements of Solano County agriculture are presented as table 3. The "size of task" are figures drawn from table 1 in terms of either acreage, or output in tons, crates, boxes, or whatever unit is commonly used. The "output per man-day" is an average figure for the entire acreage or output figured in crates,

hampers, boxes or other units as indicated in the table. If the work is of a nature that requires a crew, different members of which perform different tasks, then the average shown is per man based on the entire crew. Length of day is 9 hours, November to February, 10 hours, March to October, unless otherwise stated. Wide variations in output occur between farm and farm, field and field, and season and season, because of differences in soil types, climatic conditions, weeds, yields, and other factors influencing the amount of work that a laborer can perform in a given day. Moreover, the basis of output is a mature, experienced male worker without reference to use of women, children, and more or less inexperienced help that is sometimes used in connection with certain of the tasks requiring use of seasonal workers. The column headed "available days" reflects (a) limitations set from the period within which the work must be performed because of the nature of the task, such as transplanting, thinning, weeding, and cutting, and (b) available days as determined by weather conditions, inclement weather reducing the number of days when a required task can be performed. The "required number of individuals" is given in terms of workers as noted above in connection with "output per man-day."

It is probable that the estimated number of workers required, as recorded in table 3, will often be too low, for the reason that "peaks" frequently occur, during which an unusually large proportion of the job is done in a very short period. This would naturally require a much greater number of workers than when the work is spread over a longer period, even though the total amount of labor (in man-days) remains the same.

TABLE 3

Seasonal Labor Needs -- Solano County -- by Months and Tasks

Month	Crop and task	Size of task	Output per man-day	Required man-days	Available days	Required number of workers*
January	Grapes: Pruning	168 acres	0.75 acre	224	16	14
	Peaches (freestone): Pruning	612 acres	0.25 acre	2,448	16	153
	Pears: Pruning	922 acres	0.2 acre	4,610	16	289
	Burning brush	922 acres	4.0 acres	231	16	15
	Plums: Pruning	663 acres	0.5 acre	1,326	16	83
	Totals			8,839	16	553 man-months
February	Sugar beets: Thinning	66 acres	0.5 acre	132	19	7
	Tomatoes: Transplanting	3,321,600 plants †‡	5,000 plants	667	9	75 (Feb. 15-28)
	Grapes: Pruning	168 acres	0.75 acre	224	19	12
	Peaches (freestone): Pruning	613 acres	0.25 acre	2,452	19	130
	Pears: Pruning	768 acres	0.2 acre	3,840	19	203
	Burning brush	768 acres	4.0 acres	192	19	11
	Plums: Pruning	663 acres	0.5 acre	1,326	19	70
	Totals			8,833	19	465 man-months
March	Sugar beets: Thinning	262 acres	0.5 acre	524	19	28
	Grapes: Hoeing	126 acres	0.75 acre	168	19	9
	Pears: Pruning	154 acres	0.2 acre	770	19	41
	Burning brush	154 acres	4.0 acres	39	19	3
	Plums: Pruning	166 acres	0.5 acre	332	19	18
	Totals			1,833	19	97 man-months
April	Alfalfa: Mowing	2,000 acres ‡	7.5 acres	267	22	13
	Raking	2,000 acres ‡	15.0 acres	134	22	7
	Shocking	2,000 acres ‡	30.0 acres	67	22	4
	Sugar beets: Thinning	229 acres	0.5 acre	458	22	21
	Tomatoes: Planting	173 acres	0.75 acre	231	5	47 (Apr. 25-30)
	Apricots: Thinning	2,021 acres	0.25 acre	8,084	11	735 (Apr. 15-30)
	Grapes: Hoeing	126 acres	0.75 acre	168	22	8
	Peaches (freestone): Thinning	1,224 acres	0.25 acre	4,896	11	446 (Apr. 15-30)
	Plums: Thinning	1,657 acres	0.33 acre	5,022	11	457 (Apr. 15-30)
	Totals			19,327	22	879 man-months

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Table 3 continued

Month	Crop and task	Size of task	Output per man-day	Required man-days	Available days	Required number of workers*
May	Alfalfa: Mowing	2,000 acres ‡	7.5 acres	267	23	12
	Raking	2,000 acres ‡	15.0 acres	134	23	6
	Shocking	2,000 acres ‡	30.0 acres	67	23	3
	Hay (other than alfalfa): Mowing	12,800 acres ‡	7.5 acres	1,707	23	75
	Raking	12,800 acres ‡	15.0 acres	854	23	38
	Shocking	12,800 acres ‡	30.0 acres	427	23	19
	Baling	9,000 tons ‡	5.0 tons	1,800	23	79
	Sugar beets: Thinning	98 acres	0.5 acre	196	23	9
	Hoeing	655 acres	1.5 acres	437	23	19
	Tomatoes: Planting	519 acres	0.75 acre	692	11	63 (May 1-15)
	Hoeing	346 acres	2.0 acres	173	23	8
	Apricots: Thinning	2,021 acres	0.25 acre	8,084	11	735 (May 1-15)
	Cherries: Picking for canning	120 tons	225 pounds	1,067	15	72 (May 1-20)
	Picking for shipment	140 tons	150 pounds	1,867	23	82
	Packing for shipment	140 tons	225 pounds	1,245	23	55
	Grapes: Suckering -- 20 per cent of acreage	101 acres	0.75 acre	135	12	12 (May 15-31)
	Peaches (freestone): Thinning	1,225 acres	0.25 acre	4,900	12	409 (May 1-15)
	Plums: Thinning	1,658 acres	0.33 acre	5,025	12	419 (May 1-15)
	Totals			29,077	23	1,265 man-months
June	Alfalfa: Mowing	2,000 acres ‡	7.5 acres	267	25	11
	Raking	2,000 acres ‡	15.0 acres	134	25	6
	Shocking	2,000 acres ‡	30.0 acres	67	25	3
	Grain: Harvesting	39,360 acres ‡	5.0 acres	7,872	25	315
	Hay (other than alfalfa): Baling	9,000 tons ‡	5.0 tons	1,800	25	72
	Sugar beets: Hoeing	655 acres	1.5 acres	437	25	18
	Tomatoes: Hoeing	346 acres	2.0 acres	173	25	7
	Apricots: Picking	3,400 tons	1,000.0 pounds	6,800	17	400 (June 10-30)
	Cutting for drying	1,625 tons	600.0 pounds	5,417	5	1,084 (June 25-30)
	Other labor in dry yards	1,300 tons	¢	1,445	5	289 (June 25-30)
	Cherries: Picking for shipment	60 tons	150 pounds	800	8	100 (June 1-10)
	Packing for shipment	60 tons	225 pounds	534	8	67 (June 1-10)
	Plums: Picking	660 tons	600.0 pounds	1,100	25	44
	Totals			26,846	25	1,074 man-months
July	Alfalfa: Mowing	2,000 acres ‡	7.5 acres	267	26	11
	Raking	2,000 acres ‡	15.0 acres	134	26	6
	Shocking	2,000 acres ‡	30.0 acres	67	26	3

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Table 3 continued.

Month	Crop and task	Size of task	Output per man-day	Required man-days	Available days	Required number of workers*
July (cont.)	Grain: Harvesting	26,240 acres†	5.0 acres	5,248	26	202
	Sugar beets: Topping and loading	937 tons	6.0 tons	157	26	7
	Apricots: Picking	5,100 tons	1000.0 pounds	10,200	13	785 (July 1-15)
	Cutting for drying	4,875 tons	600.0 pounds	16,250	17	956 (July 1-20)
	Other dry-yard labor	5,200 tons	¶	5,778	17	340 (July 1-20)
	Peaches (freestone): Picking	3,068 tons	3,000.0 pounds	2,046	9	228 (July 20-31)
	Cutting for drying	3,066 tons	2,000.0 pounds	3,066	9	341 (July 20-31)
	Other dry-yard labor	2,453 tons	¶	2,820	9	314 (July 20-31)
	Pears: Picking	1,563 tons	1,400.0 pounds	2,233	21	107 (July 6-31)
	Cutting for drying	563 tons	800.0 pounds	1,408	13	109 (July 15-31)
	Other dry-yard labor	563 tons	¶	1,482	13	114 (July 15-31)
	Plums: Picking	560 tons	1,200.0 pounds	934	26	36
	Totals			52,090	26	2,004 man-months
August	Alfalfa: Mowing	2,000 acres†	7.5 acres	267	26	11
	Raking	2,000 acres†	15.0 acres	134	26	6
	Shocking	2,000 acres†	30.0 acres	67	26	3
	Sugar beets: Topping and loading	3,406 tons	6.0 tons	568	26	22
	Tomatoes: Picking	727 tons	1.25 tons	582	13	45 (Aug. 15-31)
	Almonds: Knocking	210 tons	280 pounds	1,500	21	72 (Aug.6-31)
	Hulling by hand	105 tons †	500 pounds	420	21	20 (Aug.6-31)
	Figs: Picking up for drying	70 tons	666 pounds	213	13	17 (Aug. 15-31)
	Treating with gas, drying, sorting, and sacking	70 tons	¶	280	13	22 (Aug. 15-31)
	Peaches (freestone): Picking	9,199 tons	3,000 pounds	6,133	26	236
	Cutting for drying	9,199 tons	2,000 pounds	9,199	26	354
	Other dry-yard labor	8,585 tons	¶	9,868	26	380

Table continued on next page.

Table 3 continued.

Month	Crop and task	Size of task	Output per man-day	Required man-days	Available days	Required number of workers*
August (cont.)	Pears: Picking	4,687 tons	1,400 pounds	6,696	26	258
	Cutting for drying	1,350 tons	800 pounds	3,375	26	130
	Other dry-yard labor	1,125 tons		2,961	26	114
	Plums: Picking	780 tons	1,200 pounds	1,300	26	50
	Prunes: Picking up	5,333 tons	1,500.0 pounds	7,111	13	547 (Aug. 15-31)
	Dipping and drying	4,800 tons ‡	ϕ	4,000	13	308 (Aug. 15-31)
	Totals			54,674	26	2,103 man-months
September	Alfalfa: Mowing	2,000 acres ‡	7.5 acres	267	26	11
	Raking	2,000 acres ‡	15.0 acres	134	26	6
	Shocking	2,000 acres ‡	30.0 acres	67	26	3
	Sugar beets: Topping and loading	2,214 tons	6.0 tons	369	26	15
	Tomatoes: Picking	2,180 tons	1.25 tons	1,744	26	68
	Almonds: Knocking	210 tons	280 pounds	1,500	26	58
	Hulling by machine	105 tons ‡	500 pounds	420	26	17
	Figs: Picking up for drying	70 tons	666 pounds	213	13	17 (Sept. 1-15)
	Treating with gas, drying, sorting, and sacking	70 tons	ϕ	280	13	22 (Sept. 1-15)
	Grapes: Picking	1,000 tons	1.0 ton	1,000	17	59 (Sept. 10-30)
	Peaches (freestone): Other dry-yard labor	1,227 tons	ϕ	1,411	6	236 (Sept. 1-7)
	Pears: Cutting for drying	337 tons	800 pounds	843	13	65 (Sept. 1-15)
	Other dry-yard labor	562 tons	ϕ	1,482	17	88 (Sept. 1-20)
	Prunes: Picking up	10,667 tons	1,500 pounds	14,223	26	548
	Dipping and drying	9,600 tons ‡	ϕ	8,000	26	308
	Totals			31,953	26	1,229 man-months
October	Alfalfa: Mowing	2,000 acres ‡	7.5 acre	267	24	12
	Raking	2,000 acres ‡	15.0 acres	134	24	6
	Shocking	2,000 acres ‡	30.0 acres	67	24	3

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Table 3 continued

Month	Crop and task	Size of task	Output per man-day	Required man-days	Available days	Required number of workers*
October (cont.)	Sugar beets: Topping and loading	1,958 tons	6.0 tons	327	24	14
	Tomatoes: Picking	1,937 tons	1.25 tons	1,550	24	65
	Grapes: Picking	1,000 tons	1.0 ton	1,000	16	63 (Oct. 1-20)
	Prunes: Pruning	1,256 acres	0.25 acre	5,024	12	419 (Oct. 15-31)
	Burning brush	1,256 acres	4.0 acres	314	12	27 (Oct. 15-31)
	Totals			8,683	24	362 man-months
November	Apricots: Pruning	3,032 acres	0.25 acre	12,128	21	578
	Peaches (freestone): Pruning	612 acres	0.25 acre	2,448	21	117
	Pears: Pruning	307 acres	0.2 acre	1,535	21	73
	Burning brush	307 acres	4.0 acres	77	21	4
	Prunes: Pruning	2,510 acres	0.25 acre	10,040	21	478
	Burning brush	2,510 acres	4.0 acres	628	21	30
	Totals			26,856	21	1,279 man-months
December	Apricots: Pruning	1,010 acres	0.25 acre	4,040	18	225
	Grapes: Pruning	168 acres	0.75 acre	224	18	13
	Peaches (freestone): Pruning	612	0.25 acre	2,448	18	136
	Pears: Pruning	922 acres	0.2 acre	4,610	18	257
	Burning brush	922 acres	4.0 acres	231	18	13
	Plums: Pruning	166 acres	0.5 acre	332	18	19
	Prunes: Pruning	2,510 acres	0.25 acre	10,040	18	558
	Burning brush	2,510 acres	4.0 acres	628	18	35
	Totals			22,553	18	1,253 man-months

* On a monthly basis unless otherwise noted.

† Twenty per cent added to care for replanting.

‡ Estimated portion of job done by seasonal workers.

§ Dry-yard labor, other than cutting, estimated as follows:

Apricots -- 11 man-hours per fresh ton.
Figs -- 40 man-hours per dry ton.
Peaches -- 11.5 man-hours per fresh ton.
Pears -- 26.5 man-hours per fresh ton.
Prunes -- 8.3 man-hours per fresh ton.

TABLE 4

Summary of Seasonal Labor Needs by Months
Solano County
1935

Month	Required man-days of seasonal labor	Available work days	Required man-months of seasonal labor
January	8,839	16	553
February	8,833	19	465
March	1,833	19	97
April	19,327	22	879
May	29,077	23	1,265
June	26,846	25	1,074
July	52,090	26	2,004
August	54,674	26	2,103
September	31,953	26	1,229
October	8,683	24	362
November	26,856	21	1,279
December	22,553	18	1,253
Total	291,564	—	12,563

Notes

Notes on Table 2.-- Data concerning "time of need" as shown in this table break down required seasonal labor into the period when the work is performed in order to permit a subsequent determination of labor needs by months (table 3). Some operations are performed only to a limited extent by seasonal workers. For instance, only about 80 per cent of the work in harvesting grain is estimated to have been done by seasonal workers. This having been done in two different months, a portion was assigned to each.

The amount of work done each month is based on the cropping system followed during 1935. The allotting of amounts of work is based on findings concerning local farm practices and required time to "make" a crop resulting from inquiry of producers and records of carlot shipments; the latter proving helpful in fixing dates of plantingsand of subsequent tasks involved in producing certain crops. Proportionate amounts of output harvested each month were determined from data of local practices with respect to harvesting, and from carlot shipments of perishable products. Records of truck shipments were also used when available.

Notes on Table 3.-- Table 3 is the condensed summary of labor needs as worked out for Solano County as a result of findings pertinent to 1935. The data are presented by months with the tasks which were performed in each month indicated by both crop and task. The size of the job was calculated from the data appearing in table 1 (acreage and production) and table 2 (task, time of performance, and percentage of work pertinent to a given month). The output per man-day was calculated as indicated in the foreword presenting table 3. The number of required man-days is a result of dividing the size of task by output per man-day. The available days for the different tasks involve two variables. The first is the number of days when field work is possible because of favorable weather conditions. The basis for this column was determined from a study of the monthly weather charts of the United States Weather Bureau for the years 1933, 1934, and 1935. These data indicated available days per month as follows (based on a 26-day working month without allowance for holidays):

Month	Available days*	Length of work day	Month	Available days*	Length of work day
		hours			hours
January	16	9	July	26	10
February	19	9	August	26	10
March	19	10	September	26	10
April	22	10	October	24	10
May	23	10	November	21	9
June	25	10	December	18	9

* Based on precipitation records of the Vacaville station of the U. S. Weather Bureau for the years 1933, 1934, and 1935.

The second factor influencing the number of available days was the size of the job. If the output was small in amount, then the number of days was limited to the time needed to do the work efficiently. If a field operation had to be performed in a period less than the number of available days in the month, then the specific number of days was noted. These restrictions are shown in parentheses. For example, in May the thinning of apricots was limited to 11 days in the first-

half of the month; cherry picking for canning to 15 days, etc.

The totals of table 3 show the total required man-days of needed seasonal labor, the available days for field work during the month, and the number of men (as defined in the opening paragraph of table 3) required on a monthly basis to care for the tasks ordinarily performed by seasonal workers.

In an area such as Solano County, involving a substantial area of field and truck crops, the findings as set forth in this report are bound to fluctuate materially from year to year, because of the influence of market outlook upon what and how much acreage is planted, and when it is planted; because of variable seasonal conditions affecting yields, time of performing operations, and available days; and because of harvesting operations on certain crops being speeded up to supply a good market or retarded to avoid a poor one, resulting in marked variations in the need for harvest labor.